Wireless and HFC: System Similarities

NWEST/IEEE 802
10 November 1998

Dr. James F. Mollenauer
Technical Strategy Associates
Newton, MA 02468 USA
617-244-0077
jmollenauer@TSAnet.com

Technical Strategy
Associates ?

Point-to-Multipoint Networks

- **Wireless and wired versions are very similar**
  - **MMDS has distances similar to cable TV**
  - **LMDS has shorter distances, needs cellular structure like phones**
-
- **Cable TV (hybrid fiber-coax) and cell phones are commonest examples**
-
- **Base station controls all transmission (not distributed intelligence)**
-
- **Downstream is easy:**
  - **Broadcast the data**
  - **User station identifies its data by packet address, ignores the rest**
  -
- **Upstream is harder:**
  - **Users must know when to transmit to avoid conflicts**
  - **Myriad issues of protocols, priorities, fairness, etc. etc.**
  -
- **Need for upstream traffic came late to cable TV**
  - **Upstream put in leftover spectrum with high noise and ingress**
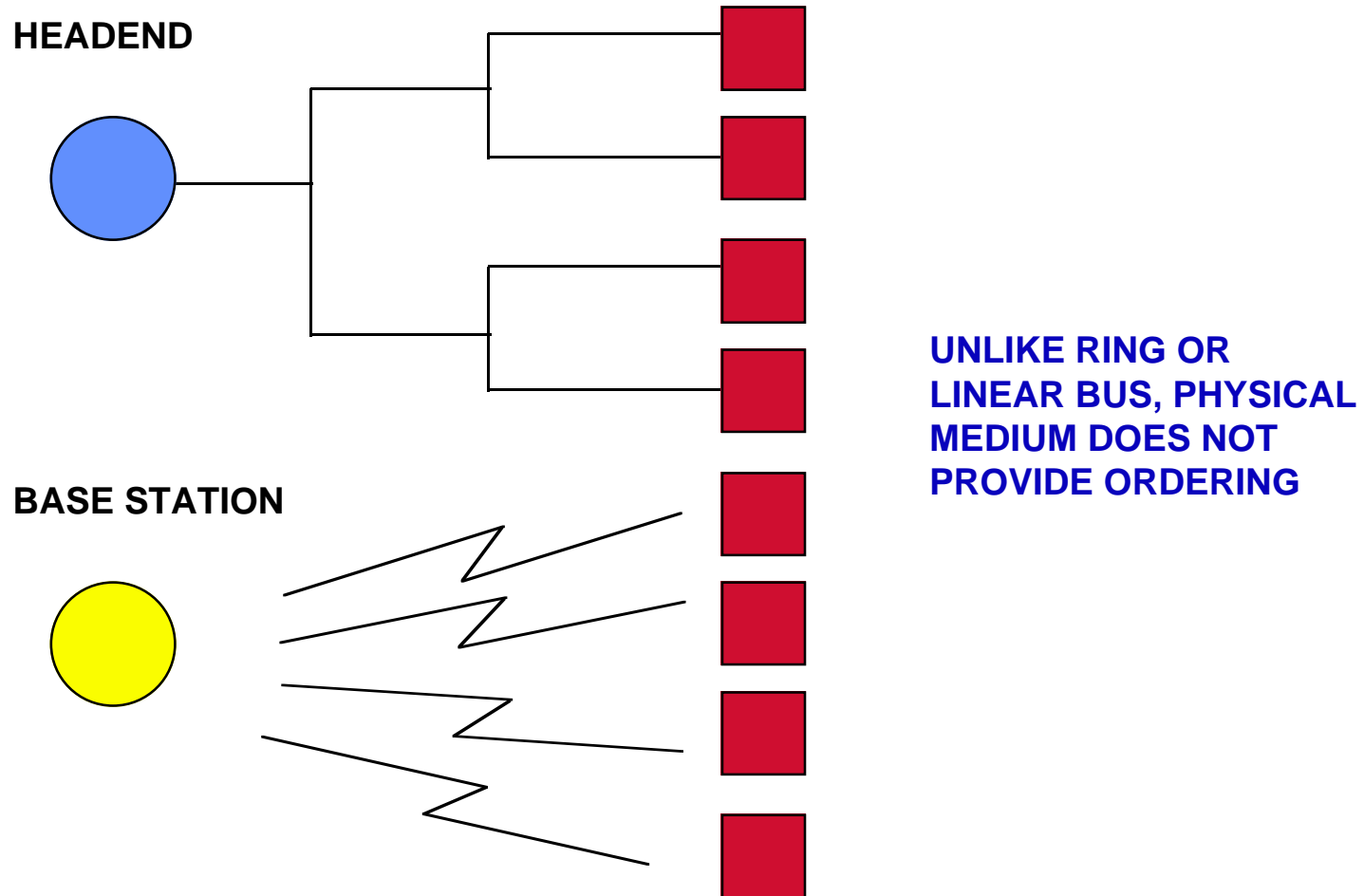
Technical Strategy
Associates ?

Similar Topologies

- **Branching bus of HFC is topologically equivalent to free space**

- **User stations don't hear each other, only the headend / base station**

- **Upstream and downstream are handled by frequency division in HFC**

- **Upstream and downstream in wireless can be handled by frequency division or time division (FDD or TDD)**

HFC and Wireless Systems

HEADEND

BASE STATION

UNLIKE RING OR
LINEAR BUS, PHYSICAL
MEDIUM DOES NOT
PROVIDE ORDERING

Technical Strategy
Associates ?

Benefitting from Current 802 Work

- **Cable modem standard 802.14 as source for MAC protocols**
  - **Request/grant mechanism**
  - **Contention resolution**
    - **Advanced ternary-tree with soft entry**
  - **Current standard based on transmission in ATM cells**
-
- **Need to support other data types as well as cells**
  - **IP packets**
  - **Legacy circuits for voice etc.**
-
- **Also:**
  - **Need to deal with priorities and flow control**
  - **Metropolitan wireless access network part of end-to-end service**
  - **New QoS/FC group starting up**

Technical Strategy
Associates ?